Northwest Atlantic Fisheries Organization

Serial No. N5514 **NAFO SCR Doc. 08/20**

SCIENTIFIC COUNCIL MEETING – JUNE 2008

Results for the Spanish Survey in the NAFO Regulatory Area of Division 3L for the period 2003-2007

by

Esther Román, Concepción González-Iglesias, Ángeles Armesto and Diana González-Troncoso

Instituto Español de Oceanografía
P.O. Box 1552. Vigo, Spain
e-mail: esther.roman@vi.ieo.es

Abstract

Since 2003, a stratified random summer bottom trawl survey in the NAFO Regulatory Area of Division 3L (Flemish Pass) was conducted by Spain. The surveys were carried out by the R/V *"Vizconde de Eza"* using bottom trawl net type *Campelen*. Entire series of mean catches, biomass and length distribution for Greenland halibut, American plaice and witch flounder are presented for the period 2003-2007. For Greenland halibut an increasing trend along the whole period in biomass and abundance is observed. A good recruitment, mainly in 2006, can be seeing; although the number of individuals of length over 70 cm. is very low. The American plaice biomass has increased since 2004 and a presence of small individuals in the last years is observer. For witch flounder, biomass estimate presents a decreasing trend since 2004.

KEYWORDS: Survey, Flemish Pass, Greenland halibut, American plaice, witch flounder.

Material and Methods

The surveys on NAFO Regulatory Area of Div. 3L (Flemish Pass) were initiated by Spain in 2003. The Research vessel *"Vizconde de Eza"* carried out the surveys following the same procedures and using the same bottom trawl gear *Campelen*. In 2003, the survey was carried out in spring (June) and it did not cover all strata adequately (69% of the total area prospected in 2006-2007). In 2004, the survey was carried out in August, for a period of nine days, and it covered only the 96%. In 2005, it was not possible to perform the survey due to problems with the winch of the ship; and in 2006, for the first time, an adequate prospecting survey was conducted in Division 3L with over 100 valid hauls. Table 1 presents the number of valid tows, the depth and number of covered strata and the dates of the survey series. Figure 1 shows haul positions of the Spanish surveys in NAFO Div. 3L in the period 2003-2007.

The survey area was stratified following the standard stratification schemes (Bishop, 1994). All surveys had a stratified random design following NAFO specifications (Doubleday, 1981). Sets were allocated to strata proportionally to their size, with a minimum of two planned hauls per stratum and the trawl positions were chosen at random. A synoptic sheet of the survey with the vessel and gear characteristics is shown in Table 2. Biomass and abundance indices were calculated by the swept area method (Cochran, 1997), assuming catchability factor of 1.

The catch from each haul was sorted out and weighted by species and a sample of each species was taken in order to measure it and obtain the length distribution. For Greenland halibut, American plaice and witch flounder, each individual of the sample was measured to the total length to the nearest lower cm. and data are given in 2 cm intervals. We present the mean catch per haul, the stratified mean catch per haul and the biomass with their variance per year and the length distribution in number per haul stratified mean catches per length, sex and year for each

species in the period 2003-2007. To obtain the biomass from length distribution, the following formula was used: Weight=a (Length+0.5)^b .

Stratified mean catches and SD

The mean catch ($\overline{y}_i$) and the variance (Var_i) are calculated by stratum by the following formulas:

$$\overline{y}_i = \sum_{j=1}^{T_i} \frac{y_j}{T_i}, \quad i = 1,...,h$$

$$Var_i = \sum_{j=1}^{T_i} \frac{(y_j - \overline{y}_i)^2}{T_i - 1}, \quad i = 1,...,h$$

where:

y_j is the catch in haul j

T_i is the number of hauls in the stratum i

h is the total number of strata

and the stratified mean catch ($\overline{y}_i^{str}$) and the stratified variance (Var_i^{str}) by stratum are obtained as follow:

$$\overline{y}_i^{str} = \overline{y}_i n_i, \quad i = 1,...,h$$

$$Var_i^{str} = Var_i \frac{n_i^2}{T_i}, \quad i = 1,...,h$$

where:

n_i is the area of the stratum i , $i = 1,...,h$

Then the total stratified mean catch ($\overline{y}$) and the variance (Var) by year are calculated according to the formulas:

$$\overline{Y} = \sum_{i=1}^{h} \frac{\overline{y}_i^{str}}{N}$$

$$Var = \sum_{i=1}^{h} \frac{Var_i^{str}}{N^2}$$

where:

$N = \sum_{i=1}^{h} n_i$ is the total area by year

The stratified standard deviation (SD) by year is calculated as the square root of the stratified variance by year.

Results

In this report, only the results for Greenland halibut, American plaice and witch flounder are presented. The results for the rest of target species will be presented in other SCR in this SC meeting. The detailed results for Northern shrimp, the most abundant species in the catches of all surveys, were presented in Casas, J. M. (2007).

Greenland halibut (*Reinhardtius hippoglossoides* Walbaum, 1792)

The Greenland halibut stock in Subarea 2 and Div. 3KLMNO is considered to be part of a biological stock complex, which includes Subareas 0 and 1. Abundance and biomass indices were available from research vessel surveys by Canada in Div. 2J+3KLMNO (1978-2007), EU in Div. 3M (1988-2007) and EU-Spain in Div. 3NO (1995-2007).

Catches increased sharply in 1990 due to a developing fishery in the NAFO Regulatory Area in Div. 3LMNO and continued at high levels during 1991-94. The exploitable biomass was reduced to low levels in 1995-97 due to very high catches and high fishing mortality. It increased during 1998-2000 due to greatly reduced catches, much lower fishing mortality and improved recruitment. The exploitable biomass has declined in recent years and the current estimates (2004-2007) are amongst the lowest in the series. Recent recruitment has been below average, and fishing mortality remains high (NAFO, 2007).

Mean catches and biomass

Table 3 shows the swept area, the tow number, the mean catches and their variance per haul and year for Greenland halibut. Table 4 and Figure 2 present the stratified mean catches per stratum with the total variance per year. Table 5 and Figure 3 present the biomass per swept area per stratum and their total variance per year. Table 6 presents the length-weight relationships.

The biomass of the Greenland halibut has had a slight increase in the prospected area along the whole period. The biomass presents the same trend as mean catches since the year 2004. In 2003, the mean catch does not follow the same pattern; this is probably due to the less area covered in 2003 survey.

Length distribution

Table 7 presents the stratified mean catches per haul length distribution for the Greenland halibut, by sex and year, with the number of samples in which there were length measures, the total number of individuals measured in these samples, the sampled catch and the range of lengths met, as well as the total catch of this species and the total hauls made in the survey. In Figures 4 and 5 the evolution along the years can be followed.

In this period a good recruitment can be seeing, although the number of individuals of length over 70 cm. is very low. Although biomass and stratified mean catch increased in 2007, the number of individuals per stratified mean catches decreased in this year, due to the good recruitment in 2006. The highest recruitment was in 2006, that appears in Fig. 4, with length classes mode 14 cm. We must wait for next years data to see the evolution of this recruitment.

American plaice (*Hippoglossoides platesoides* Fabricius, 1780)

There was no directed fishing of American plaice in 1994 and there has been under moratorium since 1995. Catches increased after the moratorium until 2003 after which they began to decline. Biomass and SSB remain low compared to historic levels. SSB declined to the lowest estimated level in 1994 and 1995. It has increased since then still remains very low. There has been no good recruitment to the exploitable biomass since the mid-1980s (NAFO, 2007).

Mean catches and biomass

American plaice haul mean catches by stratum are presented in Table 8, including swept area, number of hauls and SD. Stratified mean catches per tow by stratum and year and their variance are presented in Table 9. The entire time

series (2003-2007) of biomass and their SD estimates of American plaice are shown in Table 10. Length-weight relationships are presented in Table 6.

The American plaice indices show a general increasing trend in the prospected area along the years (Fig. 6 and 7). The highest values in the estimated biomass have been observed in the shallowest strata, in a range of depth from 93 to 274 meters.

Length distribution

Table 11 presents the stratified mean catches per haul length distribution by sex and year. As well as the number of samples in which there were length measures, the total number of individuals measured in these samples, the sampled catch and the range of lengths met. The total catch of this species and the total hauls made in the survey are shown too. In Figures 8 and 9 the evolution along the years can be followed.

In 2006 and 2007 there is presence of small individual (around 12-14 cm). There is a higher proportion of females than males.

Witch flounder (*Glyptocephalus cynoglossus* Linnaeus, 1758)

Witch flounder stock has remained at a low level since 1995. A moratorium on directed fishing was implemented in 1995. Increases in biomass indices for the whole stock area were not observed in abundance indices, suggesting the slight increasing trends in biomass are the result of growth and not recruitment (NAFO, 2007).

Mean catches and biomass

Table 12 shows the swept area, the tow number, the mean catches and their variance per haul and year for witch flounder. Table 13 and Figure 10 present the stratified mean catches per stratum with the total variance per year. Table 14 and Figure 11 present the biomass per swept area per stratum and their total variance per year. The length-weight relationships are presented in Table 6.

Witch flounder biomass has decreased since the year 2004. Estimated biomass ranged from 453 t in 2004 to a 297 t and 298 t in 2003 and 2007 respectively, although most estimate results comes from few strata. The stratified mean catches per stratum followed similar trends as the biomass indices (Fig. 10 and 11).

Length distribution

Table 15 presents the stratified mean catches per haul length distribution for this specie, by sex and year, with the number of samples in which there were length measures, the total number of individuals measured in these samples, the sampled catch and the range of lengths met, as the total catch of this species and the total hauls made in the survey. In Figures 12 and 13 we can follow the evolution along the years.

The highest recruitment was in 2003, but since then the number of younger individuals have declined.

References

BISHOP, C.A. 1994. Revision and additions to stratification schemes used during research vessel surveys in NAFO Subareas 2 and 3. *NAFO SCR Doc*., No 43, Serial No N2413, 23 p.

CASAS, J.M. 2007. Northern Shrimp (*Pandalus borealis*, Krøyer) from Spanish Bottom Trawl Survey 2007 in NAFO Divisions 3LNO. *NAFO SCR Doc*., No 79, Serial No N5465, 11 p.

COCHRAM, W. G. 1997. Sampling techniques. J. Wiley and Sons, N. Y., 23 p.

DOUBLEDAY, W. G. 1981. Manual on groundfish surveys in the Northwest Atlantic. *NAFO Sci.Coun.Studies,* **2**, 55.

NAFO. 2007. Report of Scientific Council Meeting, 7-21 June 2007.

TABLE 1.- Spanish bottom trawl surveys in NAFO Division 3L for the period 2003-2007.

Year	Vessel	Valid tows	Depth strata covered (m)	Surveyed strata (no.)	Dates
2003	R/V *"Vizconde de Eza"*	39	118-1100	17	June 2 - June 6, June 29
2004	R/V *"Vizconde de Eza"*	50	141-1452	23	August 7 - August 15
2005	-	-	-	-	-
2006	R/V *"Vizconde de Eza"*	100	116-1449	24	July 31 - August 18
2007	R/V *"Vizconde de Eza"*	94	119-1449	24	July 23 - August 11

TABLE 2.- Technical data of the Spanish survey in NAFO Division 3L for the period 2003-2007.

Procedure	**Specification**
Vessel	R/V *"Vizconde de Eza"*
GT	1400 t.
Power	1800 HP
Surveyed area	Div. 3L (depth < 1500 m, outside ZEE Canada)
Mean trawl speed	3 knots
Trawling time	30 minutes effective time
Fishing gear type	*Campelen 1800*
Headline	29.5 m
Groundrope	19.5 m
Type of groundrope	34 rockhopper
Floats	(2 x 39) + 10
Bridle	40 m (20 mm)
Vertical opening	4-5
Horizontal opening	26
Trawl doors	Polyvalent, 1400 Kg
Warp	20 mm
Warp to depth ratio	$22.287 * \text{Depth (m)}^{0.6667}$
Mesh size in the cod-end	44 mm
Type of survey:	Stratified random bottom trawl survey
Criterion to change position of a selected tow	Unsuitable bottom for trawling according to commercial fish information or ecosonder register. Information on gear damage from previous surveys.
Criterion to reject data from tow	- Severe tears in the gear - tears in cod-end - Less of 20 minutes tow - Bad behaviour of the gear
Daily period for fishing	6.00 to 22.00 hours
Target species	Greenland halibut, American plaice, Atlantic cod, roughhead grenadier, witch flounder, thorny skate, red fish, black dogfish, northern shrimp.

TABLE 3.- Swept area, number of hauls and **Greenland halibut** mean catch (Kg) and SD (**) by stratum. Spanish Survey in NAFO Div. 3L for the period 2003-2007, on board the R/V *"Vizconde de Eza"*. (*) In 2003, the data correspond to 69% of the total area prospected in 2006-2007.

	2003 (*)				2004				2006				2007			
Stratum	Swept area	Tow No.	Mean catch	SD	Swept area	Tow No.	Mean catch	SD	Swept area	Tow No.	Mean catch	SD	Swept area	Tow No.	Mean catch	SD
385	0.0225	2	0.000	0.000	0.0229	2	6.025	7.814	0.0229	2	15.721	8.173	0.0225	2	16.750	6.293
387	0.0229	2	15.890	6.661	0.0214	2	65.550	13.930	0.0225	2	52.500	4.950	0.0225	2	31.050	6.576
388	0.0334	3	20.870	13.452	0.0105	1	42.700	-	0.0566	5	47.424	8.026	0.0563	5	50.036	21.899
389	0.0454	4	0.459	0.507	0.0225	2	5.770	1.796	0.0795	7	32.941	14.261	0.0900	8	37.473	14.697
390	0.0563	5	0.020	0.029	0.0345	3	0.000	0.000	0.1249	11	12.967	16.007	0.1350	12	6.454	10.772
391	0.0338	3	0.313	0.369	0.0218	2	5.710	4.398	0.0450	4	17.633	5.302	0.0450	4	15.750	5.063
392	0.0116	1	12.500	-	0.0214	2	15.600	10.607	0.0229	2	6.900	3.111	0.0225	2	42.350	34.153
729	0.0210	2	34.860	7.552	0.0221	2	30.500	3.394	0.0338	3	24.120	9.552	0.0338	3	24.695	4.326
730	0.0221	2	24.400	5.798	0.0221	2	7.650	2.616	0.0326	3	8.403	6.415	0.0225	2	4.840	3.620
731	0.0229	2	36.350	2.758	0.0233	2	27.260	3.338	0.0341	3	16.643	6.408	0.0338	3	31.299	16.813
732	0.0113	1	43.100	-	0.0210	2	11.050	0.778	0.0334	3	6.570	3.380	0.0338	3	9.847	3.027
733	n.s.	n.s.	n.s.	n.s.	0.0330	3	18.233	2.495	0.0454	4	18.556	8.530	0.0338	3	24.610	12.655
734	n.s.	n.s.	n.s.	n.s.	0.0304	3	20.567	11.620	0.0225	2	4.478	1.340	0.0225	2	4.639	1.940
741	0.0113	1	27.200	-	0.0323	3	11.517	6.225	0.0218	2	5.648	0.583	0.0225	2	4.590	6.491
742	0.0116	1	31.800	-	0.0120	1	31.100	-	0.0229	2	10.593	1.453	0.0225	2	4.728	1.503
743	n.s.	n.s.	n.s.	n.s.	0.0188	2	8.765	10.090	0.0225	2	4.750	6.718	0.0225	2	10.925	2.185
744	n.s.	n.s.	n.s.	n.s.	0.0101	1	7.500	-	0.0229	2	10.520	9.588	0.0218	2	28.770	21.835
745	0.0341	3	11.000	8.296	0.0319	3	12.933	1.026	0.0686	6	7.227	3.098	0.0675	6	8.536	4.108
746	0.0446	4	29.503	16.252	0.0338	3	9.533	5.315	0.0675	6	5.672	4.188	0.0664	6	6.965	6.921
747	n.s.	n.s.	n.s.	n.s.	0.0308	3	0.507	0.443	0.1230	11	4.328	5.447	0.1238	11	5.519	6.837
748	0.0109	1	13.700	-	0.0199	2	6.375	5.056	0.0326	3	3.428	4.404	0.0338	3	6.460	6.984
749	0.0221	2	8.540	4.016	0.0221	2	6.550	9.263	0.0229	2	4.250	6.010	0.0113	1	4.010	-
750	n.s.	n.s.	n.s.	n.s.	0.0180	2	0.000	0.000	0.1005	9	10.041	12.221	0.0679	6	9.362	16.847
751	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s	n.s	0.0454	4	4.570	5.958	0.0225	2	20.400	15.981

$$(**)\ SD = \frac{\sum (x_i - \bar{x})}{n-1}$$

TABLE 4.- Stratified mean catches (Kg) and SD of **Greenland halibut** by stratum and year (2003-2007). n.s. means stratum not surveyed. In 2003, the data correspond to 69% of the total area prospected in 2006-2007.

	Survey				
Stratum	2003	2004	2005	2006	2007
385	0.00	710.95	-	1855.08	1976.50
387	4067.84	16780.80	-	13440.00	7948.80
388	7450.59	15243.90	-	16930.37	17862.78
389	233.76	2936.93	-	16767.19	19073.88
390	16.30	0.00	-	10567.88	5259.74
391	88.36	1610.22	-	4972.37	4441.50
392	1812.50	2262.00	-	1000.50	6140.75
729	6483.96	5673.00	-	4486.32	4593.27
730	4148.00	1300.50	-	1428.57	822.80
731	7851.60	5888.16	-	3594.96	6760.51
732	9956.10	2552.55	-	1517.67	2274.58
733	n.s.	4266.60	-	4342.16	5758.74
734	n.s.	3146.70	-	685.06	709.69
741	2720.00	1151.67	-	564.75	459.00
742	2035.20	1990.40	-	677.92	302.56
743	n.s.	447.02	-	242.25	557.18
744	n.s.	495.00	-	694.32	1898.82
745	3828.00	4500.80	-	2514.88	2970.59
746	11564.98	3737.07	-	2223.29	2730.28
747	n.s.	366.83	-	3133.67	3995.56
748	2178.30	1013.63	-	545.11	1027.14
749	1076.04	825.30	-	535.50	505.26
750	n.s.	0.00	-	5582.86	5205.09
751	n.s.	n.s.	-	1046.53	4671.60
TOTAL	65511.53	76900.01	-	99349.19	107946.61
$(\bar{y})$	14.64	12.29	-	15.32	16.64
SD	1.09	0.59	-	0.95	1.33

TABLE 5.- Survey estimates (by the swept area method) of **Greenland halibut** biomass (t.) and SD by stratum and year in NAFO Div. 3L (R/V *"Vizconde de Eza"*). n.s. means stratum not surveyed. In 2003: the data correspond to 69% of the total area prospected in 2006-2007.

	Survey				
Stratum	2003	2004	2005	2006	2007
385	0	62	-	162	176
387	356	1570	-	1195	707
388	670	1452	-	1495	1588
389	21	261	-	1476	1695
390	1	0	-	931	468
391	8	148	-	442	395
392	156	212	-	87	546
729	618	513	-	399	408
730	375	118	-	131	73
731	686	507	-	316	601
732	885	243	-	136	202
733	n.s.	388	-	383	512
734	n.s.	311	-	61	63
741	242	107	-	52	41
742	175	166	-	59	27
743	n.s.	48	-	22	50
744	n.s.	49	-	61	175
745	337	424	-	220	264
746	1037	332	-	198	247
747	n.s.	36	-	280	355
748	200	102	-	50	91
749	97	75	-	47	45
750	n.s.	0	-	500	460
751	n.s.	n.s.	-	92	415
TOTAL	5863	7121	-	8795	9603
SD	445	325	-	551	769

Table 6.- Length-weight relationships in the calculation of biomass, for Division 3L (out ZEE Canada), 2003-2007 for Greenland halibut, American plaice and witch flounder. The equation is $Weight=a(Length+0.5)^b$. To calculate the parameters for the indeterminate individuals, we used the total data (males+females+indeterminate individuals).

Year	Sex	Length-Weight Equations	N	r^2
Greenland halibut				
2003	All	$W = 0.0020\ L^{3.3855}$	429	0.9897
	Males	$W = 0.0020\ L^{3.3776}$	231	0.9858
	Females	$W = 0.0020\ L^{3.3914}$	198	0.9922
2004	All	$W = 0.0025\ L^{3.3067}$	724	0.9817
	Males	$W = 0.0021\ L^{3.3591}$	335	0.9886
	Females	$W = 0.0030\ L^{3.2628}$	389	0.9769
2006	All	$W = 0.0021\ L^{3.3631}$	1220	0.9835
	Males	$W = 0.0019\ L^{3.3863}$	583	0.9831
	Females	$W = 0.0023\ L^{3.3342}$	637	0.9835
2007	All	$W = 0.0033\ L^{3.2385}$	1544	0.9890
	Males	$W = 0.0032\ L^{3.2464}$	694	0.9876
	Females	$W = 0.0036\ L^{3.2183}$	842	0.9898
American plaice				
2003	All	$W = 0.0018\ L^{3.4328}$	725	0.9873
	Males	$W = 0.0025\ L^{3.3191}$	205	0.9813
	Females	$W = 0.0016\ L^{3.4755}$	516	0.9887
2004	All	$W = 0.0026\ L^{3.4033}$	515	0.9808
	Males	$W = 0.0045\ L^{3.1673}$	142	0.9473
	Females	$W = 0.0022\ L^{3.4001}$	373	0.9856
2006	All	$W = 0.0025\ L^{3.3723}$	759	0.9784
	Males	$W = 0.0026\ L^{3.3615}$	267	0.9629
	Females	$W = 0.0031\ L^{3.3146}$	486	0.9776
2007	All	$W = 0.0024\ L^{3.3710}$	1276	0.9873
	Males	$W = 0.0026\ L^{3.3456}$	444	0.9734
	Females	$W = 0.0028\ L^{3.3289}$	809	0.9910
Witch flounder				
2003	All	$W = 0.0019\ L^{3.3452}$	96	0.9883
	Males	$W = 0.0018\ L^{3.3564}$	39	0.9901
	Females	$W = 0.0018\ L^{3.3457}$	55	0.9861
2004	All	$W = 0.0013\ L^{3.4496}$	139	0.9888
	Males	$W = 0.0009\ L^{3.5684}$	51	0.9796
	Females	$W = 0.0013\ L^{3.4636}$	72	0.9907
2006	All	$W = 0.0026\ L^{3.2619}$	193	0.9694
	Males	$W = 0.0046\ L^{3.0994}$	65	0.9630
	Females	$W = 0.0021\ L^{3.3201}$	123	0.9631
2007	All	$W = 0.0023\ L^{3.3024}$	249	0.9776
	Males	$W = 0.0033\ L^{3.1948}$	106	0.9618
	Females	$W = 0.0025\ L^{3.2803}$	135	0.9880

TABLE 7.- Greenland halibut length distribution per haul mean catches by sex and year. Number per stratified mean catches. Spanish Summer Survey in NAFO 3L: 2003-2007 (R/V *"Vizconde de Eza"*). Indet. means indeterminate. (*) In 2003, the data correspond to 69% of the total area prospected in 2006-2007.

	2003 (*)				2004				2006				2007			
Lenght (cm.)	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total
6	0.000	0.000	0.000	0.000	0.000	0.040	0.000	0.040	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
8	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.023	0.000	0.023	0.010	0.000	0.010	0.020
10	0.493	0.643	0.000	1.135	0.000	0.040	0.000	0.040	0.264	0.081	0.009	0.353	0.157	0.156	0.062	0.375
12	1.035	1.651	0.000	2.686	0.489	0.676	0.101	1.267	2.123	1.476	0.000	3.599	0.940	0.987	0.064	1.991
14	0.890	1.249	0.000	2.139	1.079	1.416	0.000	2.495	2.640	3.178	0.000	5.818	1.092	1.467	0.000	2.559
16	0.031	0.031	0.000	0.062	0.994	1.202	0.021	2.216	1.015	1.383	0.000	2.398	0.265	0.453	0.000	0.718
18	0.058	0.058	0.000	0.116	0.063	0.423	0.000	0.486	0.046	0.146	0.000	0.191	0.061	0.010	0.000	0.071
20	0.363	0.622	0.000	0.986	0.012	0.021	0.000	0.033	0.011	0.011	0.000	0.023	0.021	0.039	0.000	0.060
22	2.073	2.633	0.000	4.706	0.279	0.105	0.000	0.384	0.011	0.089	0.000	0.100	0.190	0.042	0.000	0.232
24	3.813	3.681	0.000	7.494	0.954	0.331	0.000	1.285	0.164	0.081	0.000	0.245	0.425	0.454	0.000	0.879
26	3.032	2.546	0.000	5.578	1.705	0.806	0.000	2.510	0.401	0.350	0.000	0.751	0.600	0.691	0.000	1.291
28	1.444	1.848	0.000	3.292	1.345	1.140	0.000	2.485	0.655	0.740	0.000	1.395	0.353	0.523	0.000	0.876
30	2.214	2.132	0.000	4.345	1.942	1.303	0.000	3.245	0.821	0.697	0.000	1.518	0.205	0.084	0.000	0.289
32	2.600	2.520	0.000	5.120	2.316	1.846	0.000	4.161	0.851	0.785	0.000	1.636	0.550	0.278	0.000	0.828
34	2.470	1.885	0.000	4.355	2.215	2.114	0.000	4.329	1.539	1.359	0.000	2.898	0.884	0.781	0.000	1.665
36	1.549	1.433	0.000	2.982	1.698	2.293	0.000	3.991	1.569	1.621	0.000	3.189	1.218	1.304	0.000	2.522
38	1.120	1.335	0.000	2.455	1.336	1.751	0.000	3.087	1.260	1.920	0.000	3.180	1.431	1.580	0.000	3.011
40	0.471	0.996	0.000	1.468	0.960	1.469	0.000	2.429	1.276	1.718	0.000	2.994	1.316	2.134	0.000	3.449
42	0.399	0.814	0.000	1.213	0.351	0.796	0.000	1.147	1.310	1.560	0.000	2.870	1.115	2.049	0.000	3.164
44	0.299	0.616	0.000	0.916	0.259	0.671	0.000	0.930	0.845	1.687	0.000	2.532	1.017	1.919	0.000	2.937
46	0.080	0.249	0.000	0.329	0.116	0.284	0.000	0.400	0.484	1.016	0.000	1.500	0.688	1.408	0.000	2.096
48	0.157	0.211	0.000	0.368	0.088	0.191	0.000	0.279	0.305	0.811	0.000	1.115	0.343	1.025	0.000	1.368
50	0.133	0.224	0.000	0.357	0.079	0.084	0.000	0.163	0.128	0.416	0.000	0.545	0.146	0.719	0.000	0.865
52	0.139	0.165	0.000	0.304	0.000	0.073	0.000	0.073	0.054	0.280	0.000	0.334	0.162	0.575	0.000	0.737
54	0.050	0.201	0.000	0.251	0.052	0.066	0.000	0.119	0.070	0.175	0.000	0.245	0.058	0.324	0.000	0.382
56	0.014	0.102	0.000	0.117	0.019	0.035	0.000	0.054	0.009	0.069	0.000	0.078	0.032	0.130	0.000	0.162
58	0.028	0.022	0.000	0.050	0.013	0.040	0.000	0.053	0.031	0.061	0.000	0.092	0.031	0.060	0.000	0.091
60	0.000	0.000	0.000	0.000	0.020	0.030	0.000	0.051	0.000	0.077	0.000	0.077	0.008	0.093	0.000	0.101
62	0.000	0.077	0.000	0.077	0.000	0.010	0.000	0.010	0.014	0.020	0.000	0.034	0.000	0.069	0.000	0.069
64	0.022	0.044	0.000	0.066	0.000	0.020	0.000	0.020	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
66	0.000	0.041	0.000	0.041	0.000	0.000	0.000	0.000	0.000	0.025	0.000	0.025	0.000	0.021	0.000	0.021
68	0.000	0.000	0.000	0.000	0.000	0.041	0.000	0.041	0.000	0.021	0.000	0.021	0.000	0.010	0.000	0.010
70	0.000	0.014	0.000	0.014	0.000	0.000	0.000	0.000	0.000	0.009	0.000	0.009	0.000	0.010	0.000	0.010
72	0.000	0.044	0.000	0.044	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
74	0.000	0.019	0.000	0.019	0.000	0.041	0.000	0.041	0.000	0.010	0.000	0.010	0.000	0.000	0.000	0.000
76	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.023	0.000	0.023
78	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
80	0.000	0.014	0.000	0.014	0.000	0.000	0.000	0.000	0.000	0.010	0.000	0.010	0.000	0.010	0.000	0.010
82	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.010	0.000	0.010	0.000	0.000	0.000	0.000
84	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.009	0.000	0.009	0.000	0.000	0.000	0.000
86	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.011	0.000	0.011	0.000	0.000	0.000	0.000
88	0.000	0.022	0.000	0.022	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total	24.978	28.145	0.000	53.123	18.384	19.317	0.122	37.824	17.897	21.932	0.009	39.839	13.317	19.429	0.136	32.883
Nº samples:				35				43				94				85
Nº Ind.:	920	1035	0	1955	935	985	4	1924	1549	1907	1	3457	1205	1759	13	2977
Sampled catch:				585				695				1397				1533
Range:				10-88				7-75				9-87				9-80
Total catch:				585				695				1397				1533
Total hauls:				40				58				101				99

TABLE 8.- Swept area, number of hauls and **American plaice** mean catch (Kg) and SD (**) by stratum. Spanish Survey in NAFO Div. 3L for the period 2003-2007, on board the R/V *"Vizconde de Eza*". (*) In 2003, the data correspond to 69% of the total area prospected in 2006-2007.

Stratum	2003 (*)				2004				2006				2007			
	Swept area	Tow No.	Mean catch	SD	Swept area	Tow No.	Mean catch	SD	Swept area	Tow No.	Mean catch	SD	Swept area	Tow No.	Mean catch	SD
385	0.0225	2	3.985	2.920	0.0229	2	19.100	15.132	0.0229	2	48.530	33.757	0.0225	2	31.925	7.955
387	0.0229	2	3.850	4.031	0.0214	2	17.810	2.814	0.0225	2	6.653	5.533	0.0225	2	7.992	2.039
388	0.0334	3	7.317	2.249	0.0105	1	13.450	-	0.0566	5	7.618	2.653	0.0563	5	8.390	2.267
389	0.0454	4	6.455	2.150	0.0225	2	8.950	4.073	0.0795	7	20.584	12.793	0.0900	8	25.475	13.677
390	0.0563	5	1.854	1.584	0.0345	3	27.777	14.246	0.1249	11	76.086	51.616	0.1350	12	69.235	50.977
391	0.0338	3	6.207	1.670	0.0218	2	14.890	3.125	0.0450	4	10.585	9.713	0.0450	4	37.163	30.535
392	0.0116	1	8.400	-	0.0214	2	0.300	0.424	0.0229	2	0.000	0.000	0.0225	2	1.055	0.658
729	0.0210	2	55.190	19.643	0.0221	2	0.150	0.212	0.0338	3	0.000	0.000	0.0338	3	0.000	0.000
730	0.0221	2	59.000	21.779	0.0221	2	0.000	0.000	0.0326	3	0.000	0.000	0.0225	2	0.000	0.000
731	0.0229	2	25.610	11.017	0.0233	2	1.450	2.051	0.0341	3	0.000	0.000	0.0338	3	0.253	0.439
732	0.0113	1	40.700	-	0.0210	2	0.000	0.000	0.0334	3	0.000	0.000	0.0338	3	0.000	0.000
733	n.s.	n.s.	n.s.	n.s.	0.0330	3	1.267	1.186	0.0454	4	0.000	0.000	0.0338	3	0.320	0.554
734	n.s.	n.s.	n.s.	n.s.	0.0304	3	0.000	0.000	0.0225	2	0.000	0.000	0.0225	2	0.000	0.000
741	0.0113	1	0.000	-	0.0323	3	0.000	0.000	0.0218	2	0.000	0.000	0.0225	2	0.000	0.000
742	0.0116	1	0.000	-	0.0120	1	0.000	-	0.0229	2	0.000	0.000	0.0225	2	0.000	0.000
743	n.s.	n.s.	n.s.	n.s.	0.0188	2	0.000	0.000	0.0225	2	0.000	0.000	0.0225	2	0.000	0.000
744	n.s.	n.s.	n.s.	n.s.	0.0101	1	0.000	-	0.0229	2	0.000	0.000	0.0218	2	0.000	0.000
745	0.0341	3	0.610	0.849	0.0319	3	0.000	0.000	0.0686	6	0.000	0.000	0.0675	6	0.000	0.000
746	0.0446	4	0.000	0.000	0.0338	3	0.000	0.000	0.0675	6	0.000	0.000	0.0664	6	0.000	0.000
747	n.s.	n.s.	n.s.	n.s.	0.0308	3	0.000	0.000	0.1230	11	0.000	0.000	0.1238	11	0.000	0.000
748	0.0109	1	1.010	-	0.0199	2	0.000	0.000	0.0326	3	0.000	0.000	0.0338	3	0.000	0.000
749	0.0221	2	0.000	0.000	0.0221	2	0.000	0.000	0.0229	2	0.000	0.000	0.0113	1	0.000	-
750	n.s.	n.s.	n.s.	n.s.	0.0180	2	0.000	0.000	0.1005	9	0.000	0.000	0.0679	6	0.000	0.000
751	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s	n.s	0.0454	4	0.000	0.000	0.0225	2	0.000	0.000

$$(**)\ SD = \frac{\sum (x_i - \bar{x})}{n-1}$$

TABLE 9.- Stratified mean catches (Kg) and SD of **American plaice** year (2003-2007). n.s. means stratum not surveyed. In 2003, the data correspond to 69% of the total area prospected in 2006-2007.

	Survey				
Stratum	2003	2004	2005	2006	2007
385	470.23	2253.80	-	5726.54	3767.15
387	985.60	4559.36	-	1703.04	2045.95
388	2612.05	4801.65	-	2719.48	2995.09
389	3285.60	4555.55	-	10477.26	12966.65
390	1511.01	22637.98	-	62010.39	56426.39
391	1750.28	4198.98	-	2984.97	10479.83
392	1218.00	43.50	-	0.00	152.90
729	10265.34	27.90	-	0.00	0.00
730	10030.00	0.00	-	0.00	0.00
731	5531.76	313.20	-	0.00	54.72
732	9401.70	0.00	-	0.00	0.00
733	n.s	296.40	-	0.00	74.88
734	n.s	0.00	-	0.00	0.00
741	0.00	0.00	-	0.00	0.00
742	0.00	0.00	-	0.00	0.00
743	n.s	0.00	-	0.00	0.00
744	n.s	0.00	-	0.00	0.00
745	212.28	0.00	-	0.00	0.00
746	0.00	0.00	-	0.00	0.00
747	n.s	0.00	-	0.00	0.00
748	160.59	0.00	-	0.00	0.00
749	0.00	0.00	-	0.00	0.00
750	n.s	0.00	-	0.00	0.00
751	n.s	n.s	-	0.00	0.00
TOTAL	47434.44	43688.32	-	85621.68	88963.55
$(\bar{y})$	10.60	6.98	-	13.20	13.71
SD	0.95	1.12	-	2.06	2.00

TABLE 10.- Survey estimates (by the swept area method) of **American plaice** biomass (t.) and SD by stratum and year in NAFO Div. 3L (R/V *"Vizconde de Eza"*). n.s. means stratum not surveyed. In 2003, the data correspond to 69% of the total area prospected in 2006-2007.

	Survey				
Stratum	2003	2004	2005	2006	2007
385	42	197	-	501	335
387	86	427	-	151	182
388	235	457	-	240	266
389	290	405	-	923	1153
390	134	1969	-	5462	5016
391	156	386	-	265	932
392	105	4	-	0	14
729	978	3	-	0	0
730	907	0	-	0	0
731	484	27	-	0	5
732	836	0	-	0	0
733	n.s	27	-	0	7
734	n.s	0	-	0	0
741	0	0	-	0	0
742	0	0	-	0	0
743	n.s	0	-	0	0
744	n.s	0	-	0	0
745	19	0	-	0	0
746	0	0	-	0	0
747	n.s	0	-	0	0
748	15	0	-	0	0
749	0	0	-	0	0
750	n.s	0	-	0	0
751	n.s	n.s	-	0	0
TOTAL	4284	3901	-	7542	7908
SD	362	626	-	1150	1156

TABLE 11.- American plaice length distribution per haul mean catches by sex and year. Number per stratified mean catches. Spanish Summer Survey in NAFO 3L: 2003-2007 (R/V *"Vizconde de Eza"*). Indet. means indeterminate. (*) In 2003, the data correspond to 69% of the total area prospected in 2006-2007.

	2003 (*)				2004				2006				2007			
Lenght (cm.)	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total
2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.023	0.000	0.000	0.023	0.000	0.000	0.000	0.000
4	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.104	0.000	0.000	0.104	0.000	0.000	0.020	0.020
6	0.000	0.028	0.069	0.097	0.052	0.000	0.000	0.052	0.019	0.021	0.291	0.330	0.020	0.000	1.096	1.116
8	0.243	0.195	0.036	0.474	0.041	0.000	0.062	0.102	0.232	0.104	1.281	1.617	0.063	0.020	0.732	0.815
10	0.153	0.315	0.036	0.505	0.091	0.093	0.186	0.370	0.072	0.049	0.023	0.143	0.363	0.328	0.033	0.724
12	0.551	0.705	0.000	1.255	0.032	0.423	0.062	0.517	1.100	1.392	0.000	2.491	2.675	2.754	0.000	5.429
14	0.433	1.064	0.000	1.498	0.648	0.562	0.309	1.520	1.870	2.183	0.000	4.053	2.159	2.078	0.000	4.237
16	1.280	3.079	0.000	4.359	0.615	0.812	0.000	1.428	0.555	0.802	0.000	1.358	1.141	1.793	0.000	2.934
18	1.157	3.376	0.000	4.533	0.590	1.367	0.000	1.957	0.337	0.633	0.000	0.969	1.716	3.001	0.000	4.717
20	0.973	3.377	0.000	4.350	0.432	2.854	0.000	3.286	0.424	0.602	0.000	1.026	1.191	2.152	0.000	3.343
22	0.495	3.338	0.000	3.833	0.714	4.013	0.000	4.727	0.656	1.059	0.000	1.716	0.519	1.279	0.000	1.799
24	0.408	2.339	0.000	2.747	0.877	4.915	0.000	5.792	0.564	1.283	0.000	1.847	0.679	1.360	0.000	2.040
26	0.213	1.551	0.000	1.765	0.322	3.795	0.000	4.117	0.468	1.469	0.023	1.960	0.630	1.497	0.000	2.127
28	0.184	1.079	0.000	1.263	0.341	2.159	0.000	2.499	0.483	2.429	0.000	2.913	0.534	1.515	0.000	2.050
30	0.334	0.861	0.000	1.195	0.062	0.942	0.000	1.004	0.351	2.947	0.000	3.297	0.294	1.647	0.000	1.941
32	0.385	0.514	0.000	0.899	0.042	0.547	0.000	0.590	0.343	2.585	0.000	2.928	0.180	2.137	0.000	2.317
34	0.428	0.905	0.000	1.333	0.042	0.449	0.000	0.491	0.197	2.572	0.000	2.769	0.161	2.873	0.000	3.034
36	0.290	1.346	0.000	1.636	0.000	0.509	0.000	0.509	0.202	1.899	0.000	2.100	0.200	2.452	0.000	2.652
38	0.191	2.029	0.000	2.220	0.000	0.468	0.000	0.468	0.091	1.150	0.000	1.242	0.082	2.293	0.000	2.375
40	0.065	2.068	0.000	2.133	0.124	0.678	0.000	0.801	0.016	0.737	0.000	0.754	0.044	1.834	0.000	1.878
42	0.073	1.779	0.000	1.852	0.000	0.701	0.000	0.701	0.012	0.744	0.000	0.756	0.000	1.228	0.000	1.228
44	0.070	1.514	0.000	1.584	0.000	0.433	0.000	0.433	0.016	1.001	0.000	1.017	0.011	0.899	0.000	0.910
46	0.019	0.827	0.000	0.846	0.000	0.624	0.000	0.624	0.016	1.011	0.000	1.027	0.022	0.744	0.000	0.766
48	0.000	0.322	0.000	0.322	0.000	0.202	0.000	0.202	0.033	1.114	0.000	1.147	0.000	0.570	0.000	0.570
50	0.000	0.357	0.000	0.357	0.000	0.169	0.000	0.169	0.019	0.505	0.000	0.523	0.025	0.602	0.000	0.627
52	0.000	0.066	0.000	0.066	0.000	0.016	0.000	0.016	0.000	0.497	0.000	0.497	0.011	0.349	0.000	0.360
54	0.000	0.038	0.000	0.038	0.000	0.016	0.000	0.016	0.000	0.150	0.000	0.150	0.000	0.234	0.000	0.234
56	0.000	0.000	0.000	0.000	0.000	0.016	0.000	0.016	0.000	0.073	0.000	0.073	0.000	0.092	0.000	0.092
58	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.021	0.000	0.021	0.000	0.098	0.000	0.098
60	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.012	0.000	0.012	0.000	0.011	0.000	0.011
62	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.022	0.000	0.022
Total	7.945	33.073	0.142	41.160	5.024	26.765	0.619	32.407	8.202	29.043	1.618	38.864	12.720	35.864	1.880	50.464
Nº samples:																
Nº Ind.:				30				17				31				37
Sampled catch:	333	1297	5	1635	178	846	10	1034	704	2441	136	3281	1129	3116	179	4424
Range:				423				226				1172				1309
Total catch:				6-54				7-57				3-60				4-63
Total hauls:				423				226				1172				1309

TABLE 12.- Swept area, number of hauls and **witch flounder** mean catch (Kg) and SD (**) by stratum. Spanish Survey in NAFO Div. 3L for the period 2003-2007, on board the R/V *"Vizconde de Eza*". (*) In 2003, the data correspond to 69% of the total area prospected in 2006-2007.

Stratum	2003 (*)				2004				2006				2007			
	Swept area	Tow No.	Mean catch	SD	Swept area	Tow No.	Mean catch	SD	Swept area	Tow No.	Mean catch	SD	Swept area	Tow No.	Mean catch	SD
385	0.0225	2	0.000	0.000	0.0229	2	0.000	0.000	0.0229	2	0.240	0.339	0.0225	2	0.000	0.000
387	0.0229	2	0.260	0.368	0.0214	2	2.650	2.263	0.0225	2	3.434	2.996	0.0225	2	1.300	1.399
388	0.0334	3	0.159	0.122	0.0105	1	4.327	-	0.0566	5	0.876	0.480	0.0563	5	1.492	1.300
389	0.0454	4	0.013	0.019	0.0225	2	0.093	0.131	0.0795	7	0.284	0.372	0.0900	8	0.001	0.002
390	0.0563	5	0.000	0.000	0.0345	3	0.000	0.000	0.1249	11	0.079	0.185	0.1350	12	0.000	0.000
391	0.0338	3	0.000	0.000	0.0218	2	0.000	0.000	0.0450	4	0.388	0.775	0.0450	4	0.102	0.204
392	0.0116	1	0.008	-	0.0214	2	0.004	0.006	0.0229	2	0.195	0.276	0.0225	2	1.175	1.300
729	0.0210	2	0.785	1.110	0.0221	2	2.310	0.820	0.0338	3	1.450	1.422	0.0338	3	4.823	3.341
730	0.0221	2	5.105	4.052	0.0221	2	1.885	2.666	0.0326	3	0.460	0.797	0.0225	2	0.000	0.000
731	0.0229	2	1.815	0.969	0.0233	2	3.765	3.373	0.0341	3	3.395	2.651	0.0338	3	3.854	4.324
732	0.0113	1	7.150	-	0.0210	2	2.150	1.131	0.0334	3	1.367	1.623	0.0338	3	0.317	0.548
733	n.s.	n.s.	n.s.	n.s.	0.0330	3	2.489	2.543	0.0454	4	6.706	9.359	0.0338	3	2.052	2.218
734	n.s.	n.s.	n.s.	n.s.	0.0304	3	0.000	0.000	0.0225	2	0.190	0.269	0.0225	2	0.066	0.093
741	0.0113	1	0	-	0.0323	3	0.003	0.003	0.0218	2	0.000	0.000	0.0225	2	0.000	0.000
742	0.0116	1	0	-	0.0120	1	0.000	-	0.0229	2	0.000	0.000	0.0225	2	0.000	0.000
743	n.s.	n.s.	n.s.	n.s.	0.0188	2	0.000	0.000	0.0225	2	0.000	0.000	0.0225	2	0.000	0.000
744	n.s.	n.s.	n.s.	n.s.	0.0101	1	0.000	-	0.0229	2	0.000	0.000	0.0218	2	0.000	0.000
745	0.0341	3	0.377	0.635	0.0319	3	0.000	0.000	0.0686	6	0.000	0.000	0.0675	6	0.002	0.004
746	0.0446	4	0.000	0.000	0.0338	3	0.000	0.000	0.0675	6	0.000	0.000	0.0664	6	0.000	0.000
747	n.s.	n.s.	n.s.	n.s.	0.0308	3	0.007	0.012	0.1230	11	0.000	0.000	0.1238	11	0.000	0.000
748	0.0109	1	0.000	-	0.0199	2	0.002	0.003	0.0326	3	0.021	0.036	0.0338	3	0.000	0.000
749	0.0221	2	0.000	0.000	0.0221	2	0.000	0.000	0.0229	2	0.000	0.000	0.0113	1	0.000	-
750	n.s.	n.s.	n.s.	n.s.	0.0180	2	0.000	0.000	0.1005	9	0.000	0.000	0.0679	6	0.000	0.000
751	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	0.0454	4	0.000	0.000	0.0225	2	0.000	0.000

$$(**)\ SD = \frac{\sum (x_i - \bar{x})}{n-1}$$

TABLE 13.- Stratified mean catches (Kg) and SD of **witch flounder** by stratum and year (2003-2007). n.s. means stratum not surveyed. In 2003, the data correspond to 69% of the total area prospected in 2006-2007.

	Survey				
Stratum	2003	2004	2005	2006	2007
385	0.00	0.00	-	28.32	0.00
387	66.56	678.40	-	878.98	332.67
388	56.88	1544.74	-	312.80	532.50
389	6.36	47.08	-	144.34	0.38
390	0.00	0.00	-	64.46	0.00
391	0.00	0.00	-	109.28	28.69
392	1.16	0.58	-	28.28	170.30
729	146.01	429.66	-	269.70	897.14
730	867.85	320.45	-	78.20	0.00
731	392.04	813.24	-	733.32	832.46
732	1651.65	496.65	-	315.70	73.15
733	n.s	582.50	-	1569.26	480.17
734	n.s	0.00	-	29.07	10.02
741	0.00	0.27	-	0.00	0.00
742	0.00	0.00	-	0.00	0.00
743	n.s	0.00	-	0.00	0.00
744	n.s	0.00	-	0.00	0.00
745	131.08	0.00	-	0.00	0.58
746	0.00	0.00	-	0.00	0.00
747	n.s	4.83	-	0.00	0.00
748	0.00	0.32	-	3.34	0.00
749	0.00	0.00	-	0.00	0.00
750	n.s	0.00	-	0.00	0.00
751	n.s	n.s	-	0.00	0.00
TOTAL	3319.59	4918.72	-	4565.04	3358.07
$(\bar{y})$	0.74	0.79		0.70	0.52
SD	0.12	0.13		0.20	0.12

TABLE 14.- Survey estimates (by the swept area method) of **witch flounder** biomass (t.) and SD by stratum and year in NAFO Div. 3L (R/V *"Vizconde de Eza"*). n.s. means stratum not surveyed. In 2003, the data correspond to 69% of the total area prospected in 2006-2007.

	Survey				
Stratum	2003	2004	2005	2006	2007
385	0	0	-	2	0
387	6	63	-	78	30
388	5	147	-	28	47
389	1	4	-	13	0
390	0	0	-	6	0
391	0	0	-	10	3
392	0	0	-	2	15
729	14	39	-	24	80
730	78	29	-	7	0
731	34	70	-	64	74
732	147	47	-	28	7
733	n.s	53	-	138	43
734	n.s	0	-	3	1
741	0	0	-	0	0
742	0	0	-	0	0
743	n.s	0	-	0	0
744	n.s	0	-	0	0
745	12	0	-	0	0
746	0	0	-	0	0
747	n.s	0	-	0	0
748	0	0	-	0	0
749	0	0	-	0	0
750	n.s	0	-	0	0
751	n.s	n.s	-	0	0
TOTAL	297	453		404	298
SD	51	75		116	71

TABLE 15.- Witch flounder length distribution per haul mean catches by sex and year. Number per stratified mean catches. Spanish Summer Survey in NAFO 3L: 2003-2007 (R/V *"Vizconde de Eza"*). Indet. means indeterminate. (*) In 2003, the data correspond to 69% of the total area prospected in 2006-2007.

	2003 (*)				2004				2006				2007			
Lenght (cm.)	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total
6	0.000	0.000	0.027	0.027	0.000	0.000	0.060	0.060	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
8	0.000	0.000	0.027	0.027	0.000	0.000	0.308	0.308	0.022	0.000	0.064	0.086	0.000	0.011	0.021	0.032
10	0.027	0.027	0.000	0.054	0.042	0.000	0.101	0.143	0.033	0.022	0.011	0.066	0.022	0.011	0.055	0.088
12	0.130	0.218	0.000	0.349	0.000	0.000	0.015	0.015	0.000	0.000	0.000	0.000	0.000	0.010	0.000	0.010
14	0.383	0.699	0.000	1.082	0.015	0.000	0.074	0.089	0.042	0.009	0.011	0.062	0.011	0.070	0.032	0.113
16	0.028	0.028	0.000	0.056	0.137	0.172	0.060	0.368	0.154	0.181	0.000	0.335	0.031	0.023	0.011	0.066
18	0.051	0.026	0.000	0.076	0.110	0.181	0.060	0.351	0.115	0.150	0.000	0.265	0.022	0.011	0.010	0.043
20	0.146	0.123	0.000	0.269	0.106	0.322	0.000	0.428	0.062	0.073	0.000	0.135	0.042	0.130	0.000	0.172
22	0.045	0.071	0.000	0.116	0.197	0.370	0.000	0.567	0.104	0.316	0.000	0.419	0.120	0.260	0.000	0.380
24	0.067	0.000	0.000	0.067	0.175	0.076	0.000	0.251	0.219	0.305	0.000	0.524	0.222	0.150	0.000	0.371
26	0.043	0.046	0.000	0.089	0.094	0.185	0.000	0.279	0.020	0.108	0.000	0.128	0.137	0.098	0.011	0.246
28	0.000	0.071	0.000	0.071	0.209	0.182	0.000	0.391	0.074	0.089	0.000	0.163	0.325	0.338	0.000	0.663
30	0.181	0.229	0.000	0.410	0.142	0.050	0.000	0.192	0.105	0.223	0.000	0.328	0.116	0.111	0.000	0.227
32	0.024	0.000	0.000	0.024	0.036	0.142	0.000	0.178	0.214	0.243	0.000	0.457	0.033	0.033	0.000	0.066
34	0.095	0.090	0.000	0.185	0.012	0.233	0.000	0.245	0.128	0.119	0.000	0.247	0.030	0.066	0.000	0.095
36	0.094	0.077	0.000	0.172	0.012	0.021	0.000	0.033	0.020	0.048	0.000	0.069	0.034	0.044	0.000	0.078
38	0.075	0.045	0.000	0.120	0.073	0.029	0.000	0.102	0.021	0.129	0.000	0.150	0.022	0.081	0.000	0.103
40	0.090	0.000	0.000	0.090	0.029	0.087	0.000	0.116	0.030	0.086	0.000	0.115	0.022	0.032	0.000	0.054
42	0.024	0.103	0.000	0.127	0.000	0.179	0.000	0.179	0.000	0.072	0.000	0.072	0.022	0.012	0.000	0.035
44	0.000	0.000	0.000	0.000	0.000	0.121	0.000	0.121	0.000	0.070	0.000	0.070	0.000	0.040	0.000	0.040
46	0.000	0.026	0.000	0.026	0.000	0.000	0.000	0.000	0.000	0.011	0.000	0.011	0.000	0.065	0.000	0.065
48	0.000	0.051	0.000	0.051	0.000	0.000	0.000	0.000	0.000	0.021	0.000	0.021	0.000	0.000	0.000	0.000
50	0.022	0.000	0.000	0.022	0.000	0.030	0.000	0.030	0.000	0.009	0.000	0.009	0.000	0.011	0.000	0.011
52	0.000	0.051	0.000	0.051	0.000	0.093	0.000	0.093	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
54	0.000	0.051	0.000	0.051	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.011	0.000	0.011
56	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
58	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.020	0.000	0.020	0.000	0.000	0.000	0.000
60	0.000	0.051	0.000	0.051	0.000	0.000	0.000	0.000	0.000	0.011	0.000	0.011	0.000	0.000	0.000	0.000
Total	1.524	2.085	0.054	3.662	1.391	2.471	0.677	4.539	1.363	2.315	0.086	3.763	1.211	1.618	0.140	2.968
Nº samples:				15				17				32				22
Nº Ind.:	57	70	2	129	70	101	20	191	113	198	8	319	106	139	13	258
Sampled catch:				25				38				64				46.098
Range:				7-61				7-53				8-60				9-54
Total catch:				25				38				64				46.098
Total hauls:				40				58				101				99

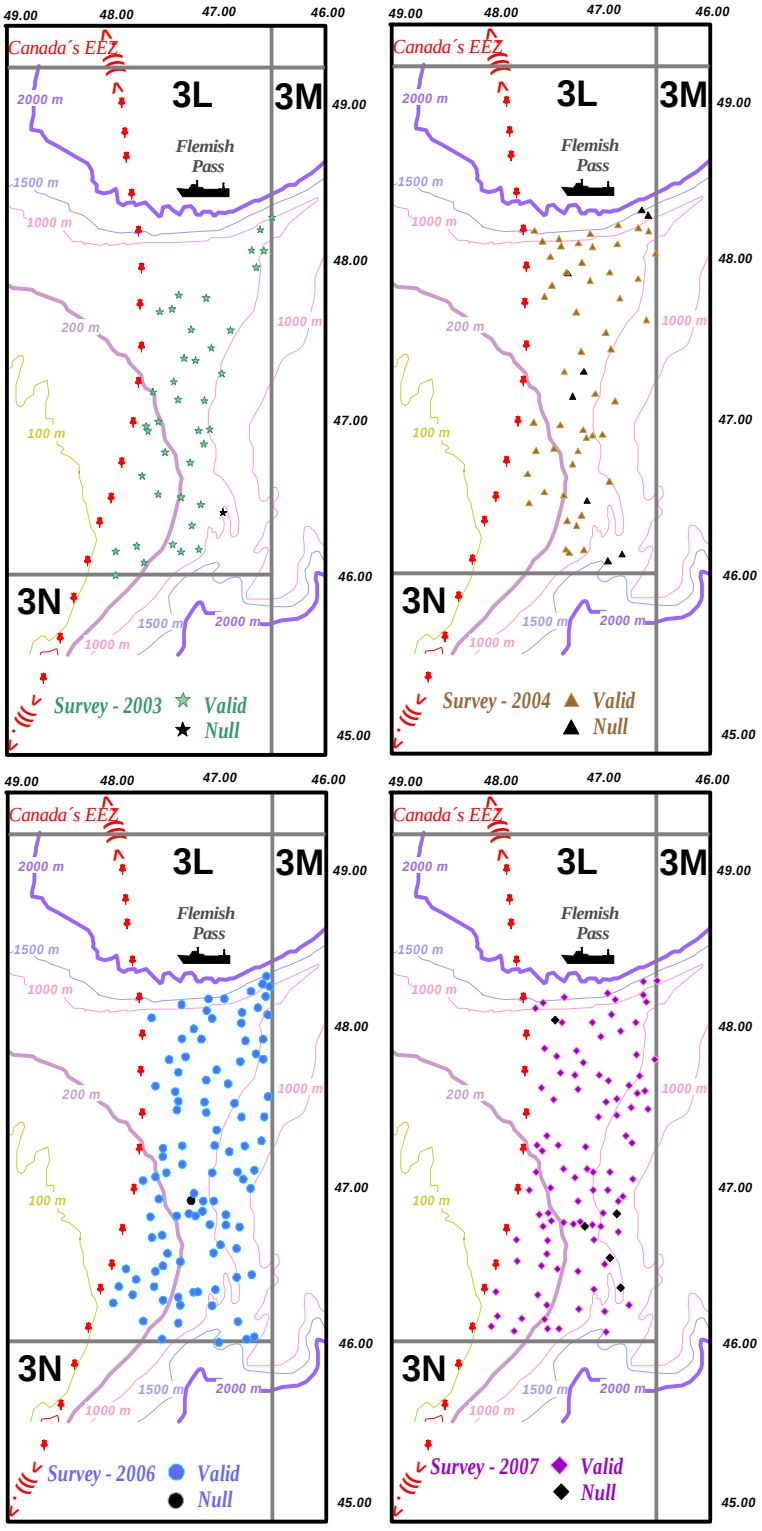

FIGURE 1.- Haul positions of the Spanish surveys in NAFO Division 3L in the period 2003 - 2007 (R/V *"Vizconde de Eza"*).

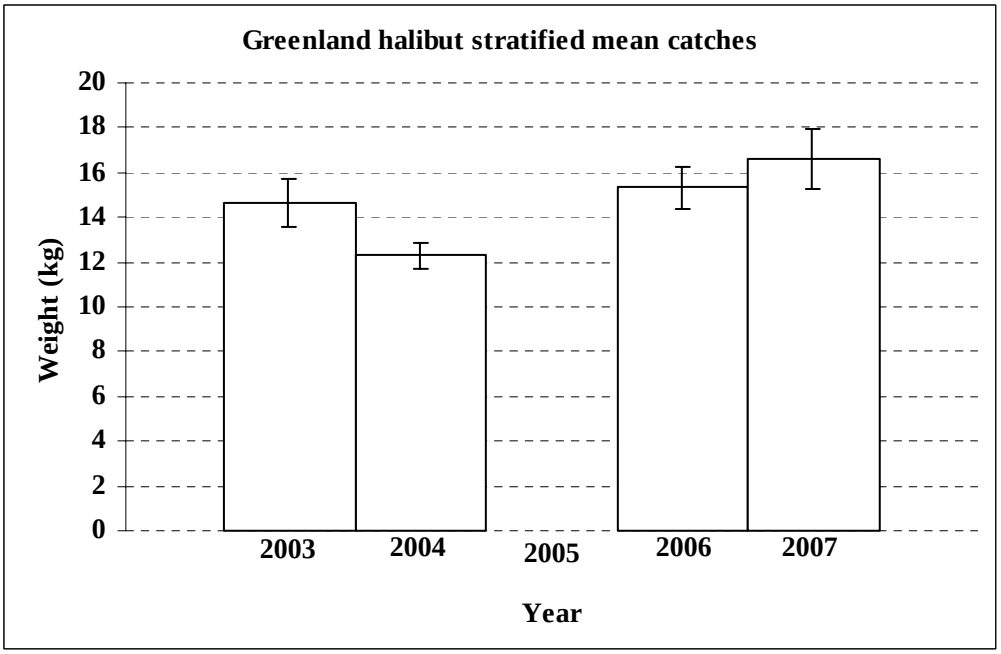

FIGURE 2.- Greenland halibut stratified mean catches in Kg and ±SD by year. Spanish surveys in NAFO Division 3L: 2003 - 2007 (R/V *"Vizconde de Eza"*). In 2003, the data correspond to 69% of the total area prospected in 2006-2007.

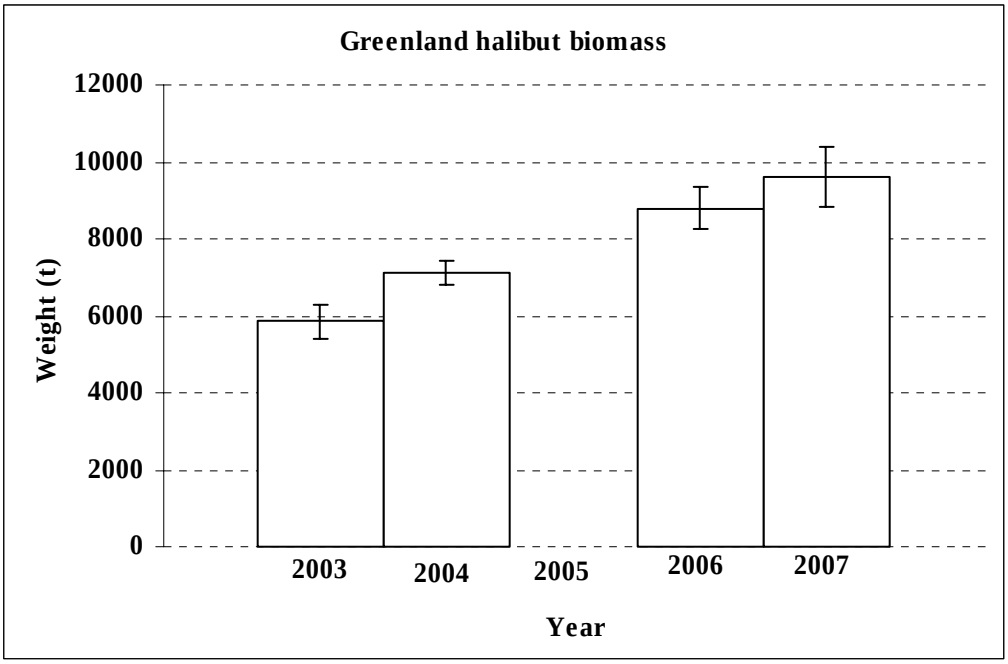

FIGURE 3.- Greenland halibut biomass in tonnes and ±SD by year. Spanish surveys in NAFO Division 3L: 2003 - 2007 (R/V *"Vizconde de Eza"*). In 2003, the data correspond to 69% of the total area prospected in 2006-2007.

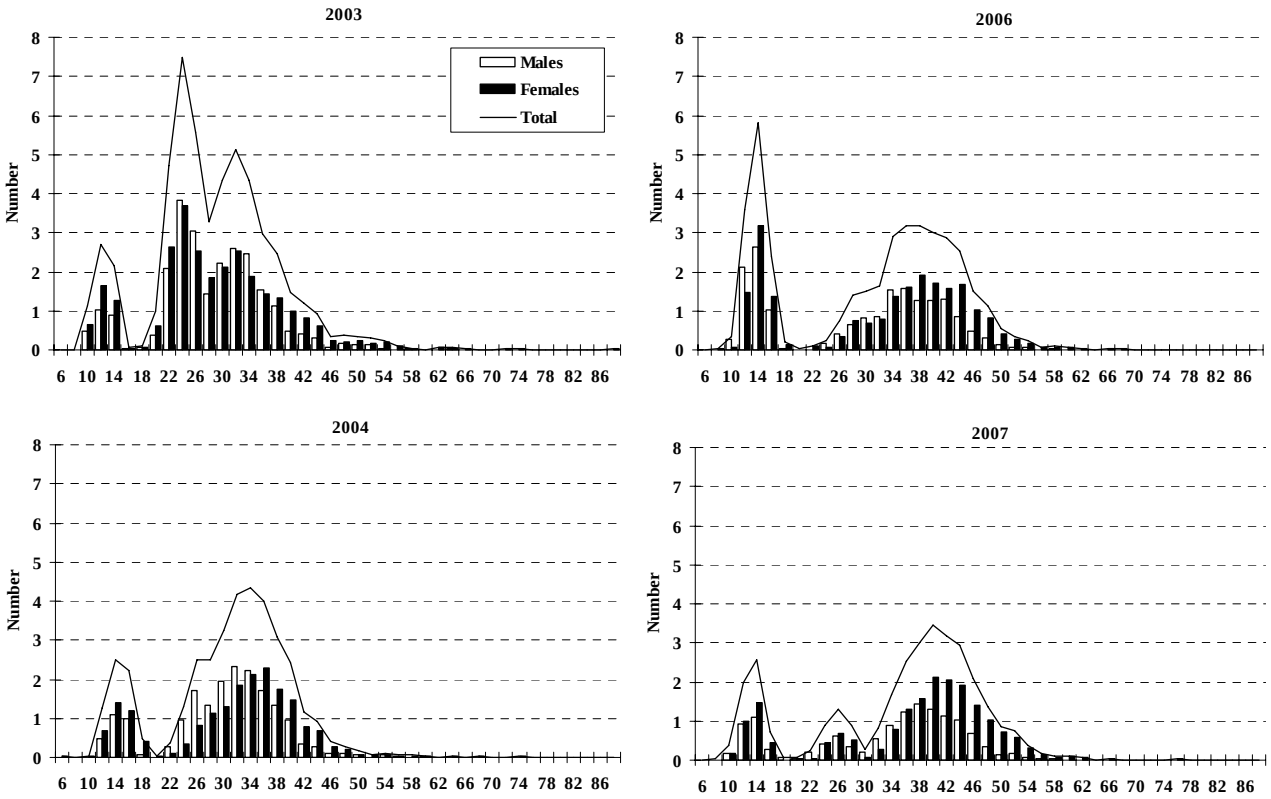

FIGURE 4.- Greenland halibut length distribution (cm) in NAFO 3L: 2003-2007. Number per stratified mean catches. In 2003, the data correspond to 69% of the total area prospected in 2006-2007.

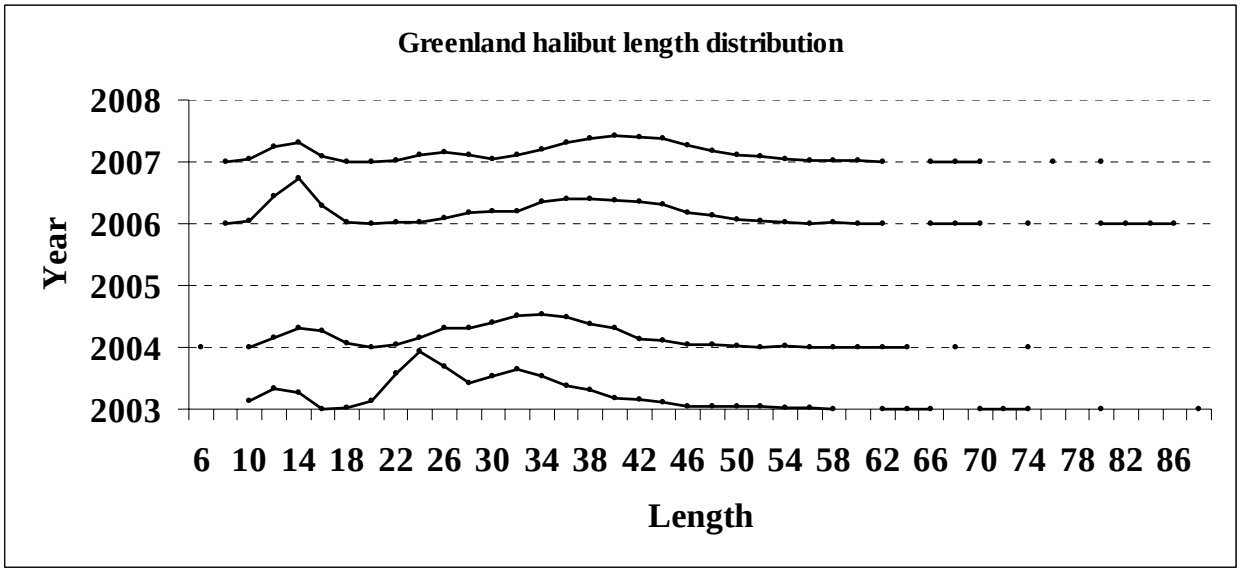

FIGURE 5.- Greenland halibut length distribution (cm) in NAFO 3L: 2003-2007.

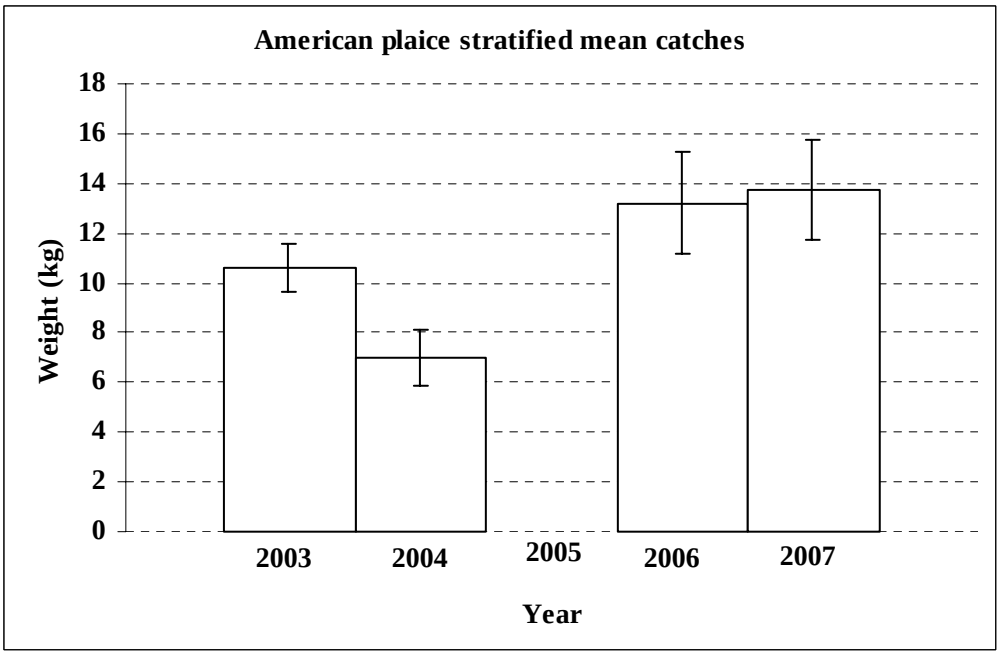

FIGURE 6.- American plaice stratified mean catches in Kg and ±SD by year. Spanish surveys in NAFO Division 3L: 2003 - 2007 (R/V *"Vizconde de Eza"*). In 2003, the data correspond to 69% of the total area prospected in 2006-2007.

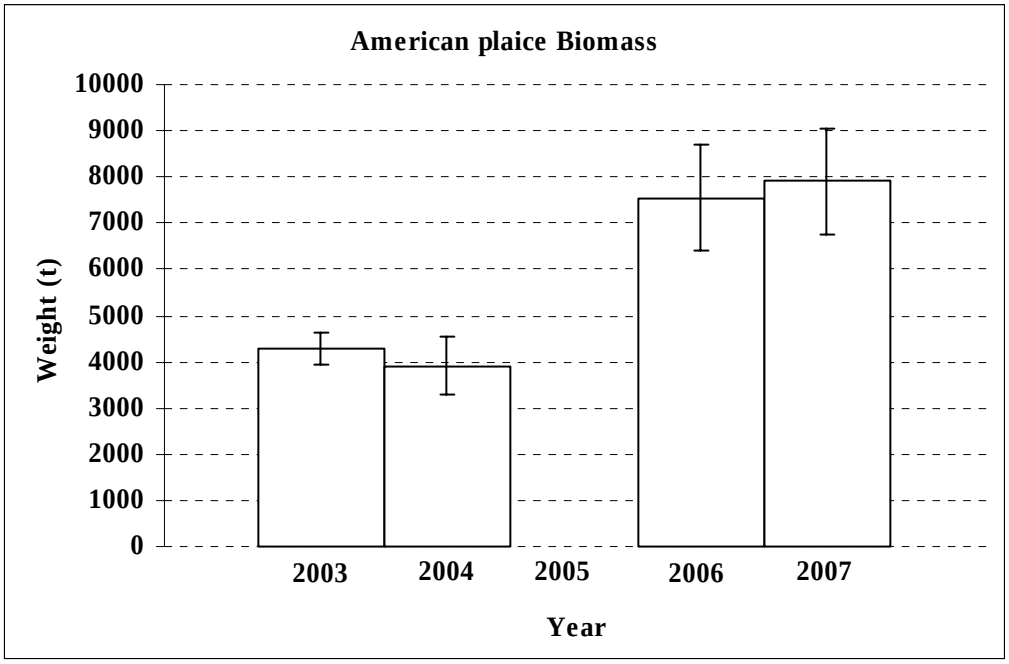

FIGURE 7.- American plaice biomass in tonnes and ±SD by year. Spanish surveys in NAFO Division 3L: 2003 - 2007 (R/V *"Vizconde de Eza"*). In 2003, the data correspond to 69% of the total area prospected in 2006-2007.

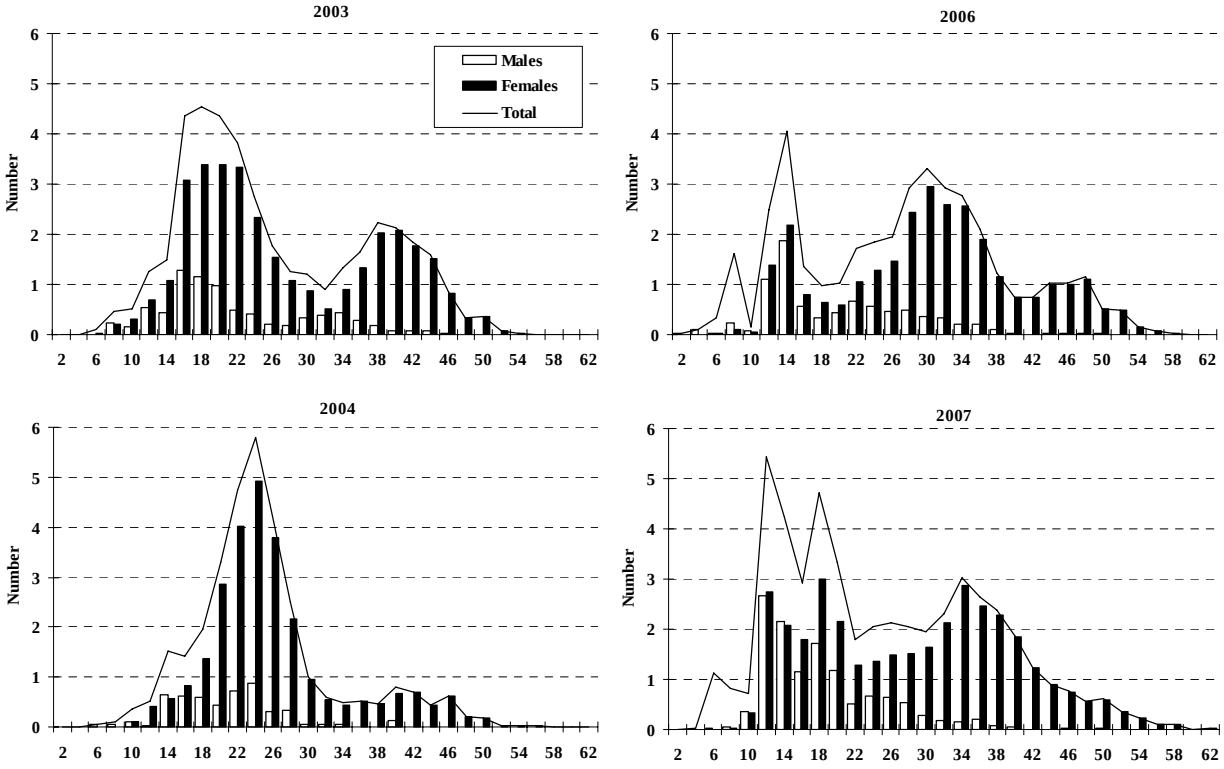

FIGURE 8.- American plaice length distribution (cm) in NAFO 3L: 2003-2007. Number per stratified mean catches. In 2003, the data correspond to 69% of the total area prospected in 2006-2007.

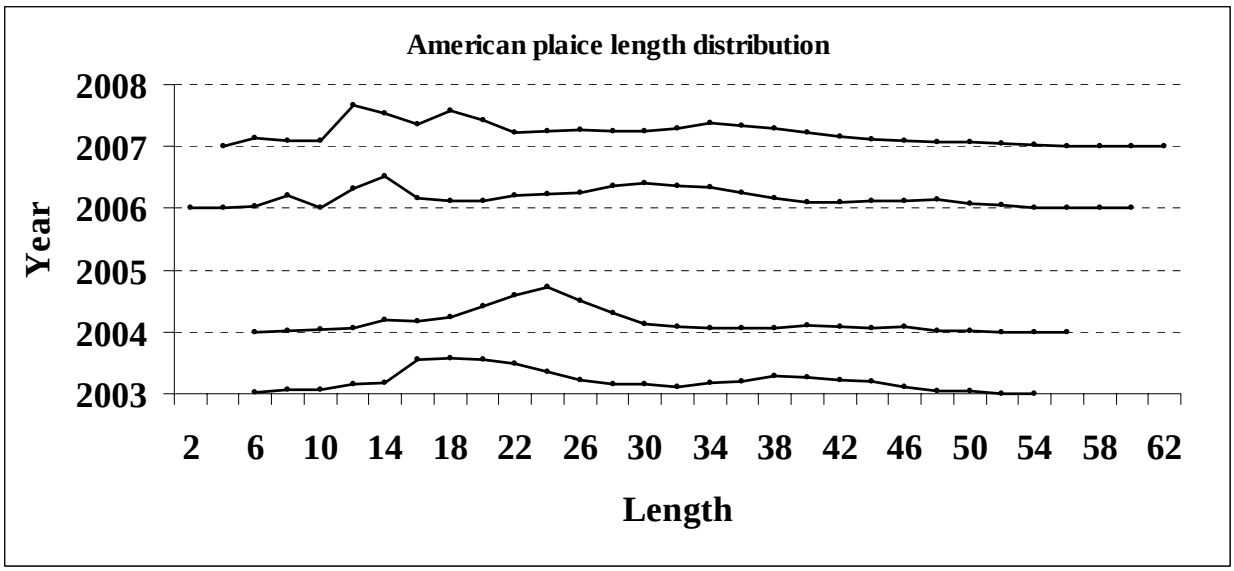

FIGURE 9.- American plaice length distribution (cm) in NAFO 3L: 2003-2007.

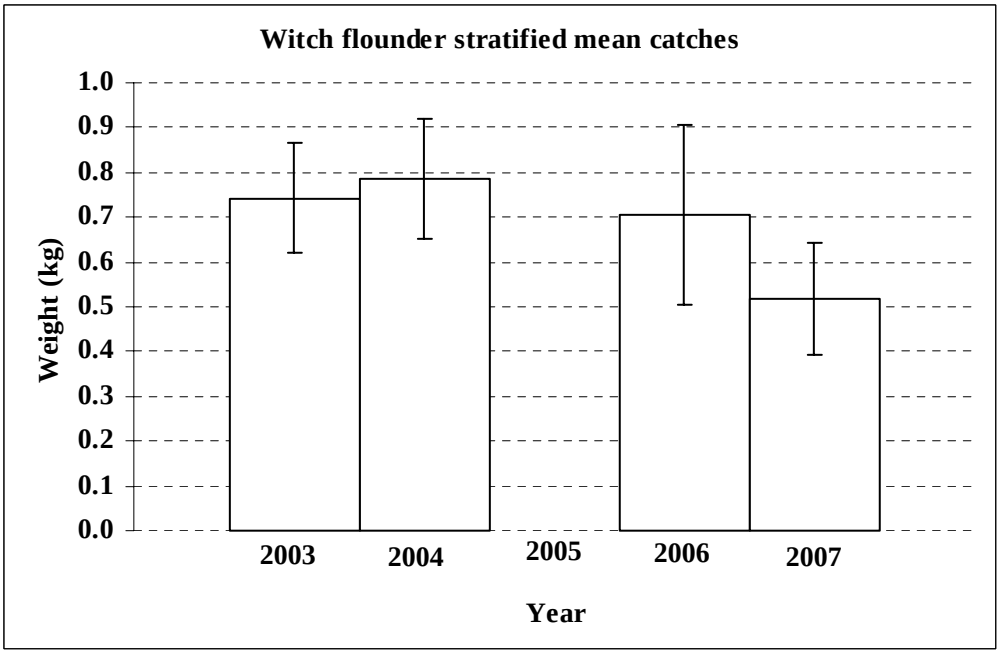

FIGURE 10.- Witch flounder stratified mean catches in Kg and ±SD by year. Spanish surveys in NAFO Division 3L: 2003 - 2007 (R/V *"Vizconde de Eza"*). In 2003, the data correspond to 69% of the total area prospected in 2006-2007.

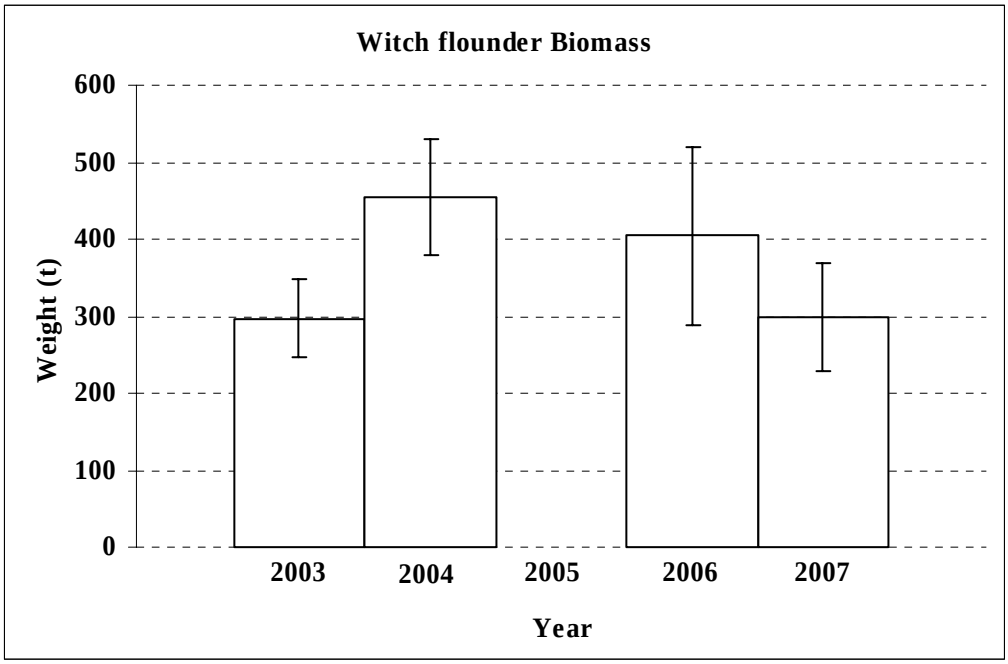

FIGURE 11.- Witch flounder biomass in tonnes and ±SD by year. Spanish surveys in NAFO Division 3L: 2003 - 2007 (R/V *"Vizconde de Eza"*). In 2003, the data correspond to 69% of the total area prospected in 2006-2007.

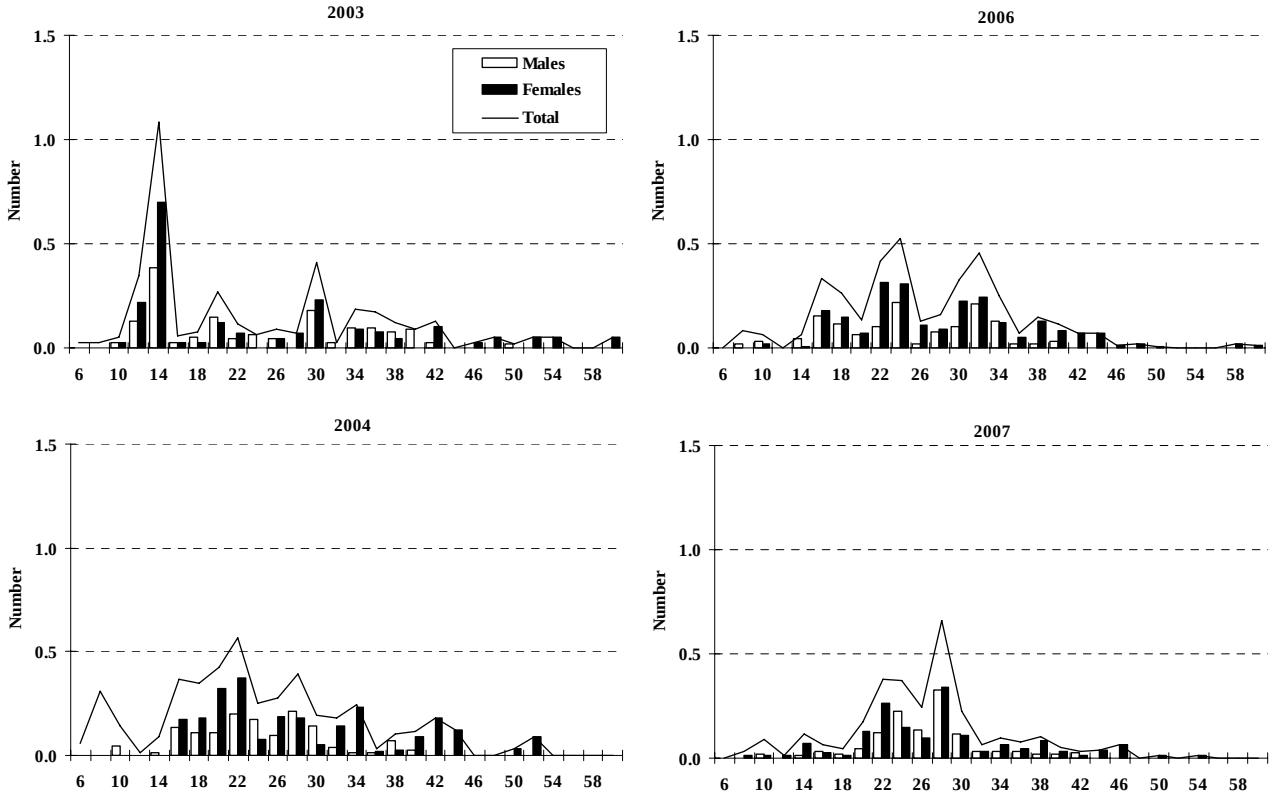

FIGURE 12.- Witch flounder length distribution (cm) in NAFO 3L: 2003-2007. Number per stratified mean catches. In 2003, the data correspond to 69% of the total area prospected in 2006-2007.

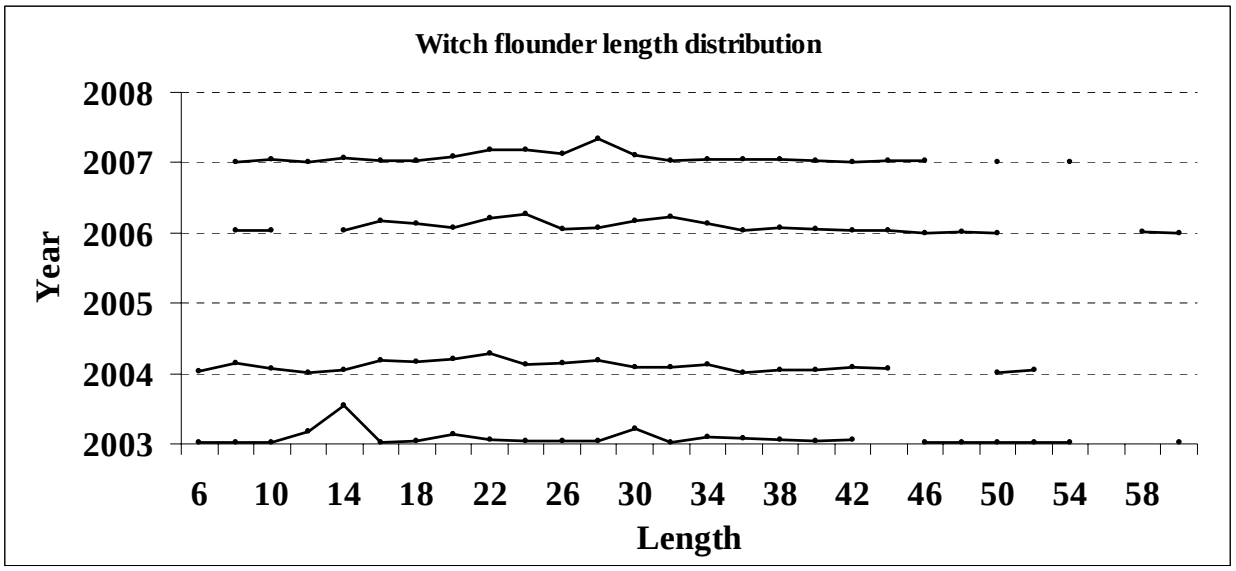

FIGURE 13.- Witch flounder length distribution (cm) in NAFO 3L: 2003-2007.